EXHIBIT 11

DRAFT

HISTORIC RAILROADS
ST. FRANCOIS COUNTY MINED AREAS

St. Francois County, Missouri

January 29, 2007

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Historic Railroads
St. Francois County Mined Areas

This report summarizes and reports the assessment of the nature and extent of mine-related materials associated with historic railroad beds in St. Francois County located in southeastern Missouri, pursuant to the Field Sampling Plan for Historical Railroads (NewFields 2006b). This report has been prepared by NewFields on behalf of The Doe Run Company and is being conducted as Additional Work pursuant to Administrative Order on Consent (AOC), U.S. Environmental Protection Agency Docket No. VII-97-F-0002, dated January 29, 1997. This report on historic railroads of St. Francois County, Missouri is submitted as an Addendum to the Focused Remedial Investigation Report dated March 2006 (NewFields 2006a).

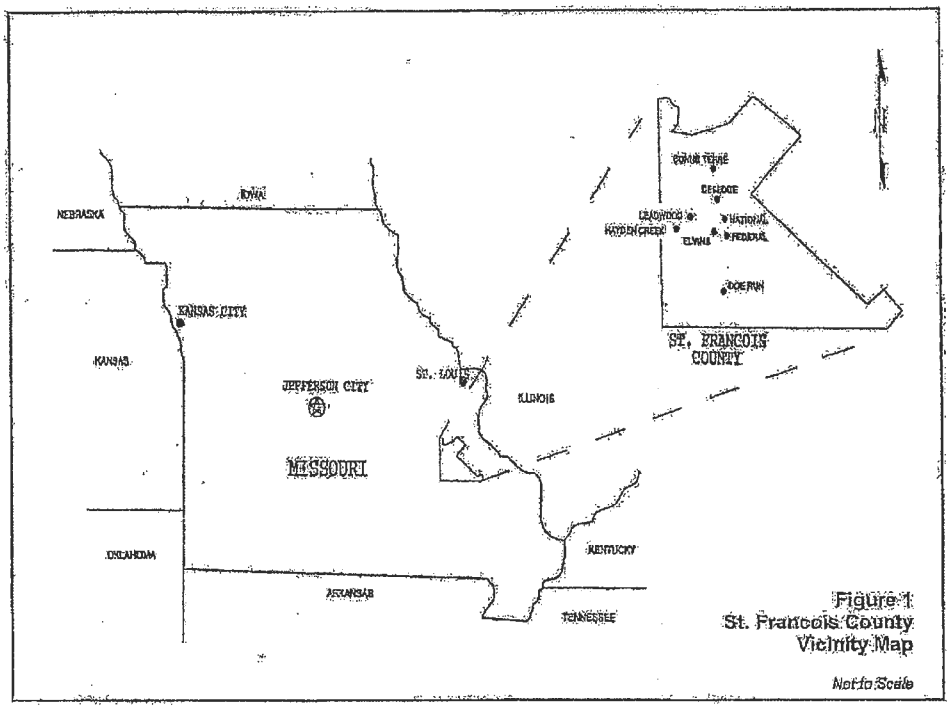
1.0 INTRODUCTION

1.1 Physical Setting

The Site is located in southeastern Missouri entirely within St. Francois County, approximately 70 miles south of St. Louis. The topography is hilly with several hundred feet of relief with altitudes ranging from about 700 to 1,000 feet above mean sea level (msl). The climate in St. Francois County is continental with cold winters and hot summers. Annual precipitation is approximately 40 inches with a rainy season in fall and winter. Average annual snowfall is 13.7 inches. Prevailing winds are from the south (Fluor Daniel 1995).

Within the Site boundaries are the incorporated towns of Desloge, Bonne Terre, Park Hills, Leadwood, and Leadington and the unincorporated towns of Frankclay, Wortham, Gumbo, Doe Run and East Bonne Terre. The population of the Site is roughly estimated at 15,000-20,000 (Fluor Daniel 1995; confirmed with 2000 Census).

St. Francois County is located in a historic mining area called the Old Lead Belt. The Old Lead Belt is on the northeastern edge of the Precambrian igneous core of the St. Francois Mountains. This area is one of the world's largest lead mining districts, having produced more than nine million tons of pig lead (MDOH 1997). The first recorded mining in St. Francois County occurred at Mine-a-Gabore between 1742 and 1762. The important discoveries of disseminated lead in the Bonne Terre, Leadwood, and Flat River areas occurred in 1864. The introduction of the diamond drill in 1869 facilitated the discovery of additional reserves and output from the mines increased dramatically in the late 1800s. Mine output from St. Francois County peaked in 1942 when the concentrate equivalent of 197,430 tons of lead was produced. Mining ceased in the Old Lead Belt in 1972 with the closing of St. Joe Lead Company's Federal mine (Fluor Daniel 1995).



Within the Site there are eight designated mining areas (Figure 1):

- Desloge (aka Big River Mine Tailings)
- Federal (aka St. Joe State Park)
- Leadwood
- Bonne Terre
- National Lead Site
- Elvins/Rivermines
- Hayden Creek
- Doe Run.

1.2 Railroad History

The first railroad constructed in St. Francois County was the St. Louis & Iron Mountain & Southern Railroad, completed in 1859 to Pilot Knob to facilitate the transportation of iron ore to St. Louis. A short summary of the more important dates in the railroad history of St. Francois County and the Old Lead Belt are listed below (Bratton and Turley 1979; Akers 1938).

- 1853-1859 – St. Louis & Iron Mountain & Southern Railroad built to Pilot Knob in Iron County.
- 1869 – Belmont Branch of the St. Louis & Iron Mountain Railroad completed between Bismarck and Belmont.
- 1880 – St. Joe & Desloge Railroad completed from Bonne Terre to Summit in Washington County.
- 1888-1890 – Mississippi River & Bonne Terre Railroad constructed from Bonne Terre through Herculaneum to Riverside.
- 1891 – Mississippi River & Bonne Terre Railroad extended 18 miles to the town of Doe Run.
- 1904 – St. Francois County Electric Railroad begins operation in Farmington.
- 1903-1905(?) – Illinois Southern Railroad constructed through St. Genevieve and St. Francois County to Bismarck.
- 1912-1917 – Saline Valley Railroad operated between Saline Junction and Farmington.
- 1972 – Missouri-Pacific Belmont Branch, formerly owned by St. Louis & Iron Mountain & Southern Railroad, is abandoned.

Articles published in the Lead Belt News in 1924 and 1938 discussing railroads in St. Francois County are provided in Appendix D. Rail lines, both historic and active, are shown on Figure 2.

1.3 Railroad Construction

On side slopes, the railroad grade was constructed using the cut and fill method; that is, soil, rock, and clay were excavated from the uphill side and used to form the core of the alignment and as support for the downhill side of the grade. As observed in the field, the final cover consisted of 12 to 18 inches of chat. The chat provided a granular, easily handled, well-drained aggregate for bedding the wooden cross ties. Besides side slopes, relatively thin chat ballast was observed in flat "cut" sections through hills and where the grade was constructed on existing topography. Fill was used across low-lying areas, at stream crossings (*e.g.* HRR-3), and where it was necessary to construct ramps to crest a divide. Chat was used almost exclusively where large quantities of fill were needed to meet grade requirements.

0 2,800 5,600 11,200 16,800 22,400 Feet

Figure 2
Locations of Cross-sections
and Ballast Samples

Railroads built prior to the advent of dump trucks were constructed by transporting men, equipment and materials to the end of the newly constructed railhead. Ballast was brought in by rail car and dumped at the end of the new rail line. Once the surface of the ballast was brought up to grade, the ties and rails were placed. After a new rail section was set in place and spiked to the ties, more ballast was brought in and the process was repeated.

Modern railroad ballast that meets American Railway Engineering and Mining Association (AREMA) specifications contains between 45 and 80 percent plus 3/4-inch sized rock. An example, Wilson #4 1.5-inch AREMA railroad ballast has been used since the late 1800s. Like most railway ballast, it is composed of a very hard, indurated rock, 100% crushed granite. Other rock types include basalt, metamorphic rock, and hard limestone. In the historic railroad grades of St. Francois County, the chat ballast material is much smaller with a maximum grain size of about 1/2 inch in diameter. A typical chat ballast sample is characterized as a "sand and small gravel". Besides chat, traces of clinker and coal were common. Iron ore was a component of the ballast in the Illinois Southern track, as observed in the sample from HRR-9 south of St. Joe State Park. The rails from this railroad were removed relatively recently, some 20 years ago.

2.0 SUMMARY OF INVESTIGATION

In a July 17, 2006 meeting, EPA requested that The Doe Run Company conduct an investigation to characterize historic railroads in the County, with specific attention given to cadmium, lead, and zinc content in the ballast material and the volume. A field investigation was conducted on November 14-17, 2006 following approval of a Field Sampling Plan (RRFSP) dated October 16, 2006 (NewFields 2006b).

Thirteen (13) locations along the historic railroads were identified in the RRFSP to assess the cross-sectional area and sample remaining railroad ballast (Figure 2). All transect locations were on private land or within St. Joe State Park and access was obtained by The Doe Run Company prior to inspection. No clear evidence of a railroad could be found at the HRR-7 location, so the HRR-14 location was added upon obtaining access. Of the 13 transects, 12 were sampled and cross sections were measured at all 13 locations. Additionally, field volume estimates were made at three other locations (see Figure 2).

2.1 Historic Railroad Mapping

The extent of historic railroads was mapped in AutoGIS and submitted with the Focused Remedial Investigation (RI) in March 2006. Figure 2 depicts approximately 69 miles of abandon railroads. The rail locations depicted in the project GIS and on figures in this report were identified using The Doe Run Company's historic mining maps, Sanborn

insurance maps, 1984 (St. Joe State Park) black and white and April 1998 color aerial photography, and a 1908 topographic map (Buckley 1908). Rail lines that were ground-truthed in the field were categorized as "verified". Many sections of railways are now covered by roads or have been converted to residential and commercial areas, and the present-day existence of these old lines could not be field verified. Figure 2 and the figures in Appendix A show the unverified rail lines in light green and the verified rail lines in yellow or pink. Approximately 44 percent of the lines were verified, 160,107 linear feet or 30.3 miles. Approximately 204,191 linear feet, or 38.7 miles, are unverified and are located primarily in towns or under mill waste piles or are located away from the St. Francois County Mined Area site boundary (see Figure 2).

Some of the historic railroads within St. Joe State Park have been paved with asphalt and converted to bike/hiking trials. The volume of ballast was estimated at transect HRR-13 but samples were not collected due to the presence of the paving.

Some ballast has been completely removed as a result of post-rail line construction activities, such as in highway cuts. These areas, highlighted in pink, are noted on Figure 2 as well as in figures in Appendix A. Approximately 9,442 linear feet of ballast has been removed (length included in the verified rail lines).

2.2 Vegetation and Soil Development

The historic railroads that cross through forested areas exhibited extensive regrowth owing to the fact that they have stood undisturbed for some 100 years. Moderate to dense secondary growth of oaks, cedar, hackberry, hickory, Japanese elm, sycamore and other species of trees, brush, honeysuckle, and vines are noted on the field forms (Appendix B). Sycamore trees growing through or rooted in the ballast had trunks up to 16 inches in diameter. While dense vegetative growth was typical on the ballast slopes, dense growth on the flat, upper surface was not common. Most of the historic railways inspected serve as trails and unimproved roads, thus shrub and tree growth on the traveled surface is much thinner and less developed. In the few instances where the grades were not used for travel, there was no apparent difference between the vegetation density on and off the railway ballast.

The organic layer covering the chat ballast in forested areas is well developed owing to the almost continuous supply of litter provided by the surrounding oak/hickory forest. Thinner litter layers are associated with the short leafed pine forests in and around St. Joe State Park. Side slopes and lightly traveled portions of the railway grades typically exhibited a dark brown to black, 4- to 6-inch organic-rich layer over the chat ballast. Exposed ballast in open grassed areas typically exhibited a thinner organic layer; however, grasses and shrubs were better established in the open sunny (non-shaded) areas. Steep 40-degree slopes did not exhibit an organic layer and were only thinly covered with vines and brush.

Regardless of vegetative cover, the chat ballast appeared quite stable with little evidence that it was susceptible to erosion. Where penetrated by trees and tree roots it was very stable. As part of the original construction, culverts were placed in channels and low areas to convey runoff under the railway. Erosion rills were observed on some of the steeper barren chat slopes and in areas where motorcycle or ATV use was prevalent. In general, the chat slopes appeared to be quite stable unless they are very steep or have been disturbed by man.

2.3 Cross Sections of Ballast

Cross-sections were used to assess the average thickness of the ballast in the historic railroads. A cross-section was established at each transect shown in Figure 2 by measuring the top surface of the railroad grade and measuring the horizontal distance of the crest and from toe to toe of the side slopes. The thickness of the ballast was then measured by tape or sight line and, if possible, confirmed using a shovel. At the field personnel's discretion, the ballast was either trenched or a series of exploration pits were made into the ballast. The cross-sectional areas for each transect are listed in Table 1. The character of the material was described, including, but not limited to, grain-size, color, consistency, and organic content.

Table 1 Transects and Cross-Sectional Areas

Transect	Location	Area (ft^2)	Volume per running foot (cy)
HRR-01	Leadwood	253	9.4
HRR-02	Desloge	85	3.1
HRR-03	Desloge/Owl Creek	9823	364
HRR-04	Bonne Terre	78	2.9
HRR-05	Leadwood	75	2.8
HRR-06	National	26	1
HRR-07	St. Joe State Park, rail grade not located	NA	NA
HRR-08	St. Joe State Park	10	0.4
HRR-09	Illinois Southern RR	157	5.8
HRR-10	Leadwood	110	4.1
HRR-11	Gumbo	335	12.4
HRR-12	Elvins/Rivermines	418	15.5
HRR-13	Paved St. Joe State Park bike trail	214	7.9
HRR-14	Bonne Terre	150	5.5

Volumes shown are bank cubic yards. For bulk volumes, apply a swell factor of 110%.

2.4 Ballast Volume Estimation

The volume of ballast was estimated by taking the cross-sectional area from Table 1 and multiplying by a measured segment length. ArcGIS calculated the segment length using the base aerial photography. Segment lengths and associated cross-sectional areas are listed in Table 2. Refer to maps provided in Appendix A for specific end points.

Table 2 Verified Railroad Segment Volumes

Segment Location		Length (ft)	Volume per running foot (cy) and reference transect, if used	Segment Volume (cy)
From	To			
Shaft DR #8	Section line	4,159	9.4 HRR-1	39,097
Section line	HRR-11	3,076	12.4 HRR-11	38,141
HRR-11	Old Highway 8	4,051	12.4 HRR-11	50,231
Gumbo	Owl Creek Crossing (OCC)	3,351	33	110,576
West OCC	East OCC	1,171	364 HRR-3	426,395
East OCC	Landfill Road	913	5	4,567
Highway 8	Trailwood St., Desloge	1,863	3.1 HRR-2	5,775
Trailwood St., Desloge	Landfill Rd	1,230	3.1 HRR-2	3,812
Owl Creek	HRR-12	7,399	15.5 HRR-12	114,681
Highway 8	HRR-5	12,852	4.1 HRR-10	52,694
HRR-5	HRR-4	8,228	2.8 HRR-5	23,038
Brightwell Park	National water tower	600	1 HRR-6	600
Shaft Fed #2	St. Francois River	27,927	0.4 HRR-8	11,171
Junction MR & BT RR	St. Joe State Park entrance	5,592	0.4 HRR-8	2,237
St. Francois River	Site boundary, south of town of Doe Run	12,451	2.4	29,883
West: State Hwy B, Illinois Southern RR	East: State Hwy W, Illinois Southern RR	18,244	5.8 HRR-9	105,815
St. Joe State Park tailings edge	Shaft Fed #10	15,702	7.9 HRR-13	124,063
Junction with active RR, south Bonne Terre	Northern Site boundary	21,853	5.5 HRR-14	120,190

Volumes shown are bank cubic yards. For bulk volumes, apply a swell factor of approximately 110% for a clean sand.

2.5 Ballast Sampling

At each transect a composite sample was collected using shovels to characterize the metal content of the ballast. Each composite was composed of four or five aliquots collected to represent the bulk of the ballast material, even if two (or more) distinct materials are identified in the ballast.

For each sampling location a field sheet was constructed diagramming a plan and profile view of the railroad bed and the aliquot sampling locations (see Appendix B). The diagrams show the general configuration of the railroad and other hard features nearby used for locating the sampling area (roads, fences, etc.). Photographs taken during the sampling are also included in Appendix B.

The following information was recorded on the field sampling forms included in Appendix B:

- GPS coordinates and description of sampling point
- Names of sampling team members
- Volume of sample collected
- Sampling methodology
- Plan and profile of transect
- Date and time of sample collection
- Sample identification
- Grain size, slope, erosion, and plant cover
- Nature of organic layer, if present
- Vertical and horizontal ballast measurements
- Photograph numbers and aspect
- Evidence of recent use
- Field portable XRF assay of composite sample.

All samples were analyzed by EPA Method SW-846 6010B for cadmium, lead, and zinc at Evergreen Analytical Laboratory in Wheat Ridge, Colorado. Analytical results are show in Table 3. Copy of the laboratory report is provided in Appendix C.

Table 3 Cadmium, Lead, and Zinc Concentrations in Ballast Sample Composites

Location	Cadmium	Lead	Zinc	Ratio Zn/Cd
HRR-01	3.3	11000	130	39.4
HRR-02	31	13000	1400	45.2
HRR-03	23	5900	860	37.4
HRR-04	16	14000	880	55.0
HRR-05	120	6400	4500	37.5
HRR-06	13	8200	430	33.1
HRR-08	21	14000	710	33.8
HRR-09*	0.82	250	230	280.5
HRR-10	9.9	1800	330	33.3
HRR-11	1.7	9000	58	34.1
HRR-12	20	17000	680	34.0
HRR-12A*	25	11000	890	35.6
HRR-14	9.6	4200	340	35.4

Notes: * HRR-09 excluded from comparisons in Section 3.0 Summary. HRR-12A is a Duplicate of HRR-12.

One sample blind duplicate was collected at HRR-12. Quality control procedures listed in the St. Francois County QAPP (Dames & Moore 1997) were followed. Duplication of the lead concentrations in HRR-12 and HRR-12A indicates that the ballast lead concentrations are not homogeneous even in well-mixed samples. The so-called "nugget effect" was anticipated as it is almost always observed in duplicate or paired chat sample results.

3.0 SUMMARY

The volume of ballast in the verified historic railroad beds within the investigation area totaled 1,262,966 cubic yards. This is only a rough estimate since 16 volume measurements were made over a rail distance of 30.3 miles. By comparison, there are approximately 39.3 million cubic yards of chat and tailings in the six large piles in the County (RI Table 2-4, NewFields 2006a).

The measured lead concentration in most of the composite samples of chat ballast was at the high end of the range for chat in St. Francois County. Measured cadmium concentrations were quite variable but well within the range reported for St. Francois County. Zinc concentrations were low, comparable only to mill waste from the National, Bonne Terre and Federal piles. The observed zinc to cadmium ratio (Zn/Cd) of 33-55 compares well with the Zn/Cd range of 39-55 reported for mill waste from the six large piles in St. Francois County (RI Table 2-5, NewFields 2006a).

4.0 REFERENCES

Akers, J. Clyde, 1938. A History of St. Francois County Railroads, published in Lead Belt News, June 10.

Bratton, K. and Richard Turley, 1979. St. Joe State Park: The Economic, Social, and Physical Impact of Missouri's Second Largest State Park. Southeast Missouri Regional Planning and Economic Development Commission, March 1979.

Buckley, E.R. 1908, Geology of the disseminated lead deposits of St. Francois and Washington Counties: Rolla, Missouri Division of Geology and Land Survey, v. IX, parts 1 and 2, 259 pages (includes plate XLVIII, Geologic Maps of the Flat River – Leadwood Areas).

Dames & Moore, 1997. Field Sampling Plan for Focused Remedial Investigation/Feasibility Study, St. Francois County, Missouri. November 19.

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MDOH, 1997. Big River Mine Tailings Superfund Site, Lead Exposure Study: Report to the Agency for Toxic Substances and Disease Registry. Draft Final Report, April 21.

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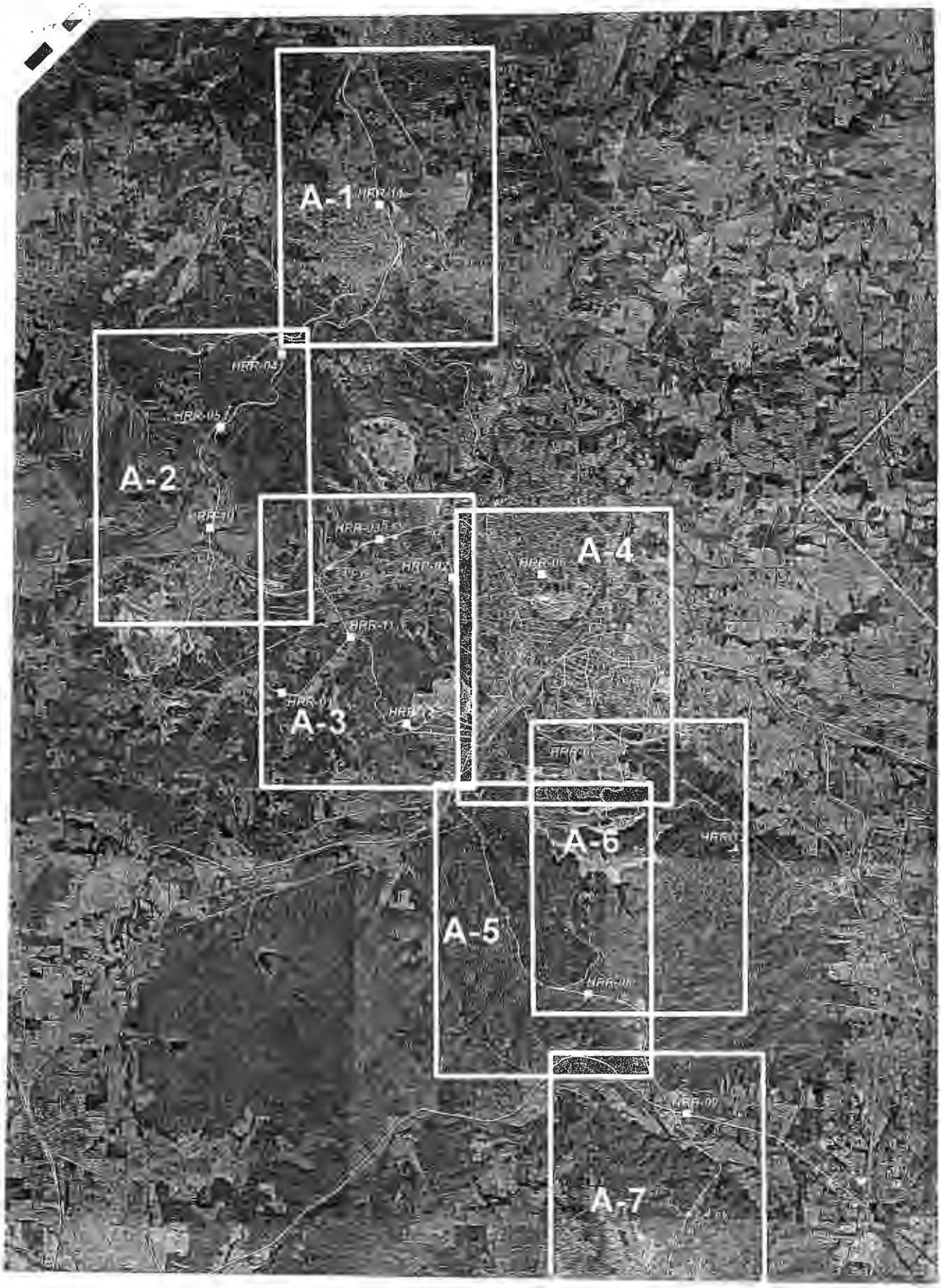
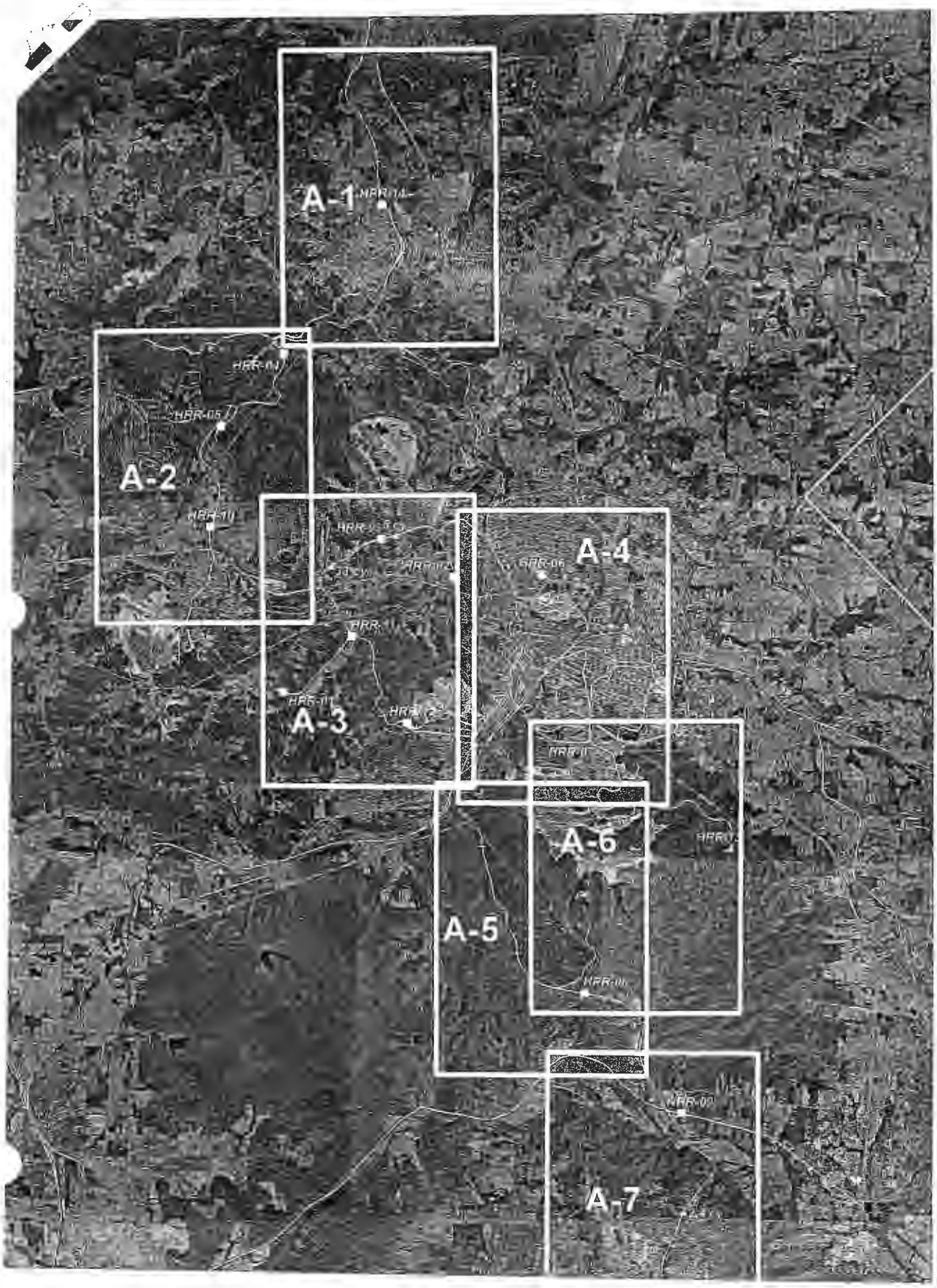
NewFields, 2006b. Field Sampling For Historical Railroads, St. Francois County Mined Areas, Missouri. October 16.



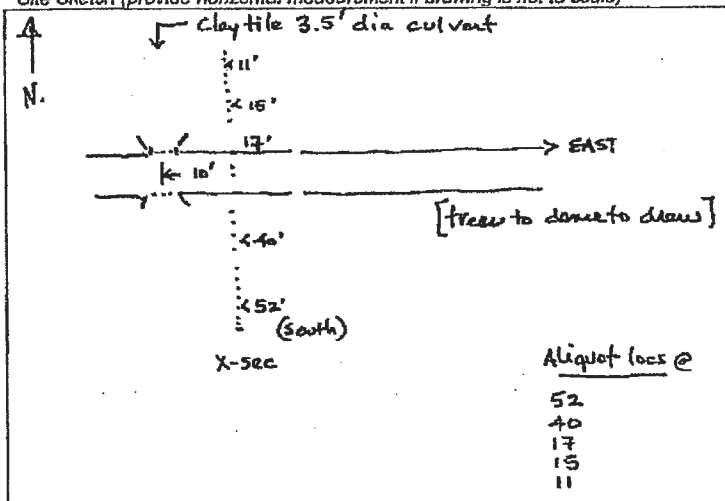


Historical Railroads Ballast Characterization

Sampling Location: HRR-1 Date: 11/14/06

GPS N. 37° 56' 43.275" and W 90° 34' 23.173' between LW & RM

Site Sketch (provide horizontal measurement if drawing is not to scale) W. Sutton - owner.



Legend:

< sample/aliquot loc.

pix 76 look east (2494)

pix 75 S. to culvert. (2495)

BASE 11' 55 11 28 39 28 16 55'

Mark horizontal locations of all sample aliquots

Vegetation Description: Cedar, ash, sycamore, japanese elm ... sycamore to 16" ø

DRH, BG, Larry H. well veg - w/ trees, no grass., larger trees spaced 15-20'.

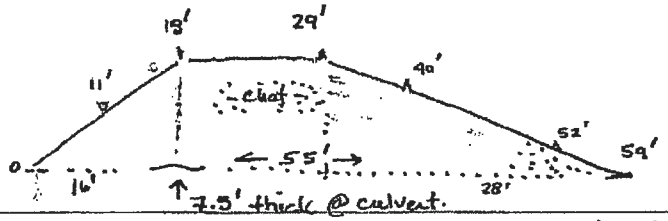
Cross-Section (provide both horizontal and vertical measurements)

Looking EAST.

all chat, mod to coarse dirty.

est. 7.5' height @ 18' and 29' crests.

NO clay core, All fill.



Legend: XRF 7680 Pb. @ loc. 40.

TIME: 1530 hrs

VOLUME/AREA : $(7.5 \times 11) + (8 \times 7.5) + (14 \times 7.5) = 253$ ft²

Mark locations of all sample aliquots

Sampling Method: 5 part composite Sample ID(s) HRR-1

Analysis Requested 6010B for Cd, Pb and Zn Volume: 8oz Laboratory: EAL

Comments: Access road, used, top hasten but sideslopes are stable

HRR-1, Looking east.

HRR-1, South to culvert.

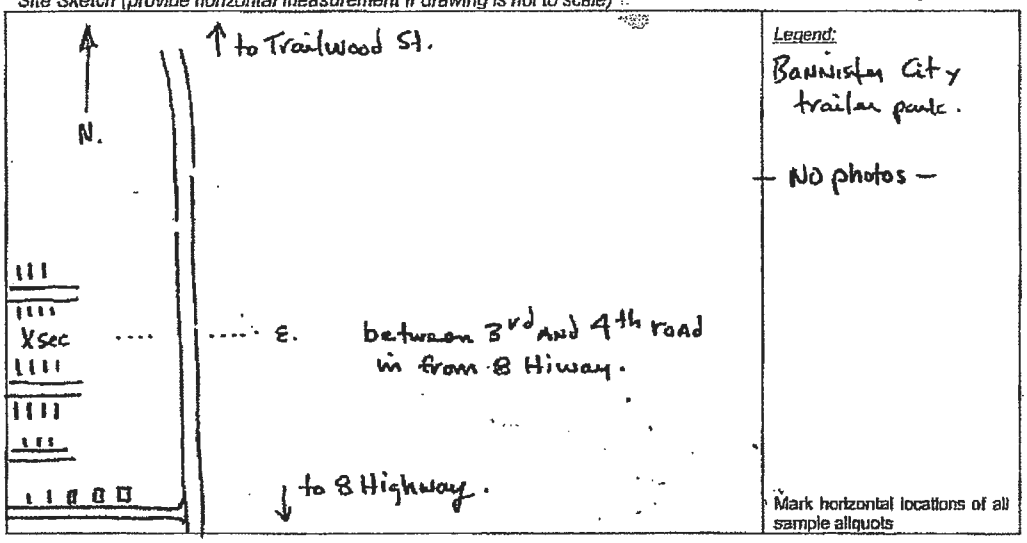
Historical Railroads Ballast Characterization

Sampling Location: HRR-2 Date: 11/15/06 DRH/LH/BG

GPS N. 37° 51' 54.505" and W. 90° 32' 10.216"

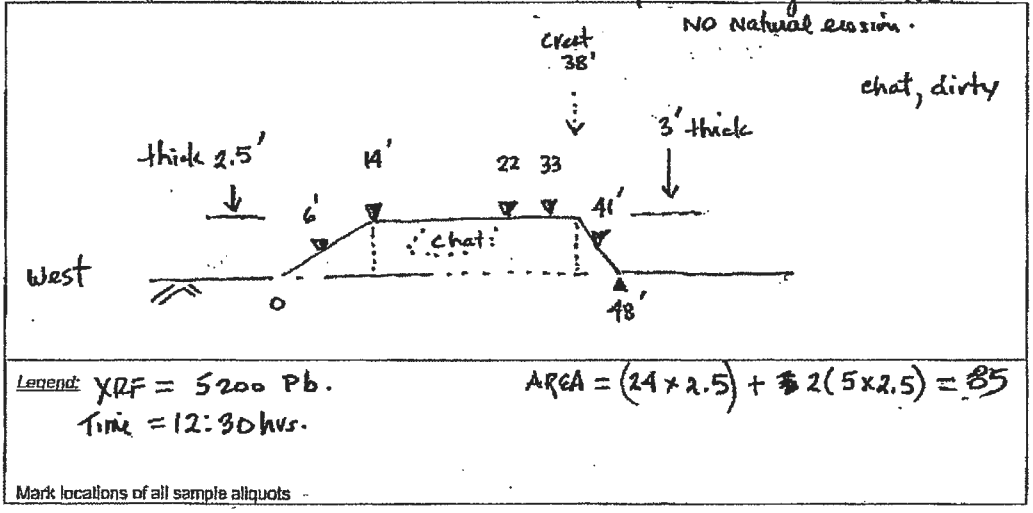
S of DL. rain

Site Sketch (provide horizontal measurement if drawing is not to scale)



Vegetation Description: crest barren but edges w/ vine, honeysuckle, rest dense hardwoods. 8" organics, thick, rooted tough to get thru.

Cross-Section (provide both horizontal and vertical measurements) Open areas grassed 100%



Sampling Method: shovel, 5 pnt. Sample ID(s) HRR-2

Analysis Requested 6010B for Cd, Pb and Zn Volume: 8 oz Laboratory: EAL

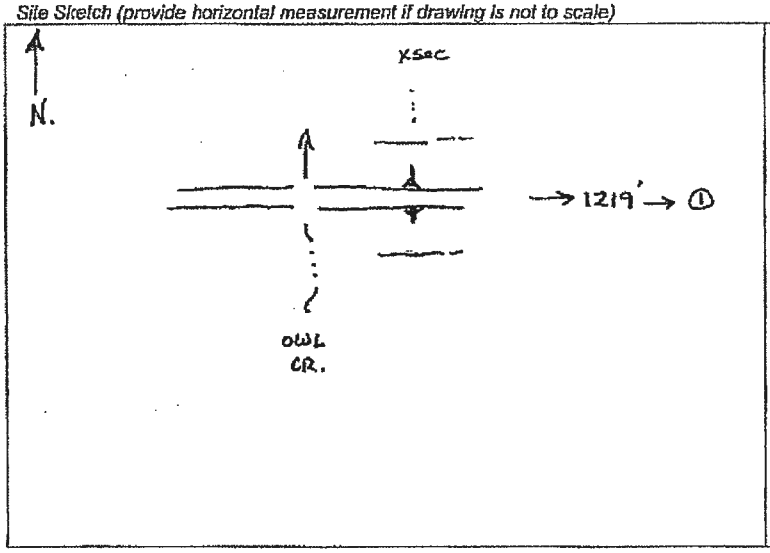
Comments: standard fill section.

Historical Railroads Ballast Characterization

Sampling Location: HRR-3 Date: 11/16/06 DRH/BG/LH.

GPS N 37° 52' 18.440" and W. 90° 33 06.206" SW of DL

Site Sketch (provide horizontal measurement if drawing is not to scale)



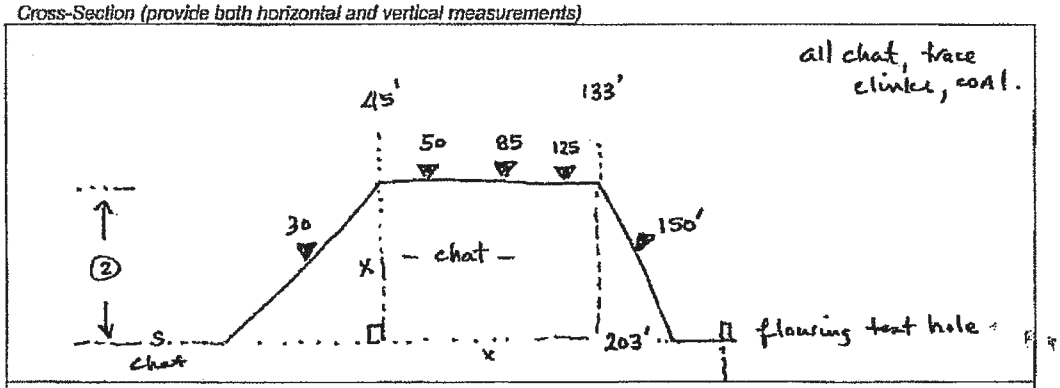
Legend:
pix No. 65 (2510) South face
No. 64 look W. (2512)

1,219' to transect from BONEHOLE RD. called Landfill Rd.

Mark horizontal locations of all sample aliquots

Vegetation Description: None, barren. Owl Creek Crossing.

Cross-Section (provide both horizontal and vertical measurements)



Legend: TIME 0800

② take height off topo map.

XRF = 2460 ppm Pb

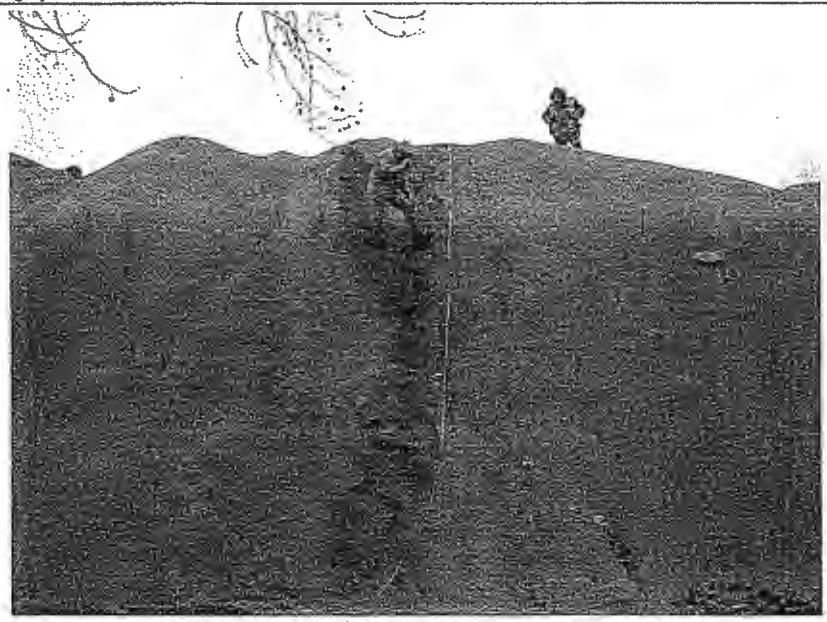
(88'x60)+(1081)+(1190) = 9823 @ 60'X

Mark locations of all sample aliquots

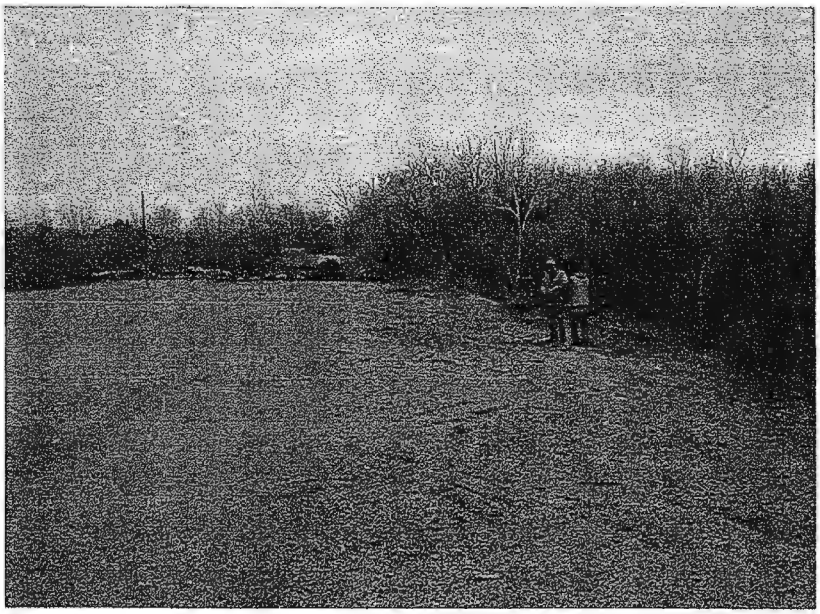
Sampling Method: shovel. 5 part comp. Sample ID(s): HRR-3

Analysis Requested 6010B for Cd, Pb and Zn Volume: 8oz. Laboratory: EAL

Comments: large chat fill crossing for Rt



HRR-3, Picture 65. South face.



HRR-3, Picture 64. Looking west.

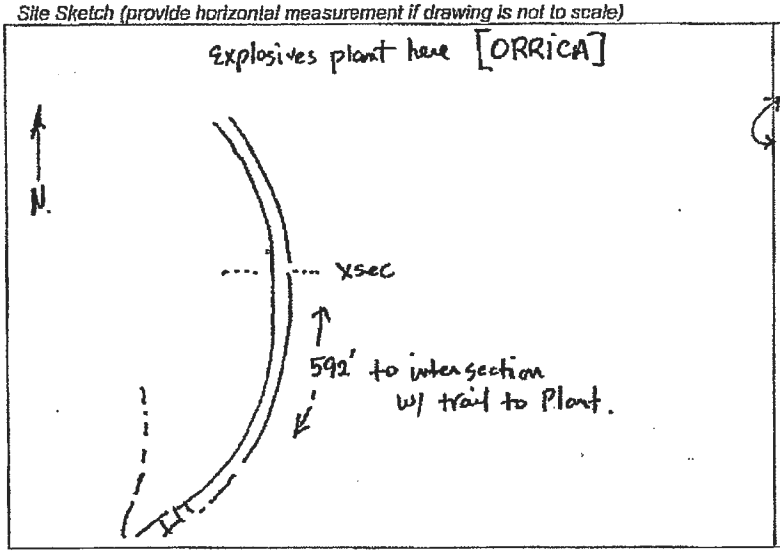
Historical Railroads Ballast Characterization

Sampling Location: HRR-4 Date: 11/15/06 dlb

GPS N. 37° 54' 14.425" and W. 90° 34' 22.017" Between LW & BT

Rain — 42° F.

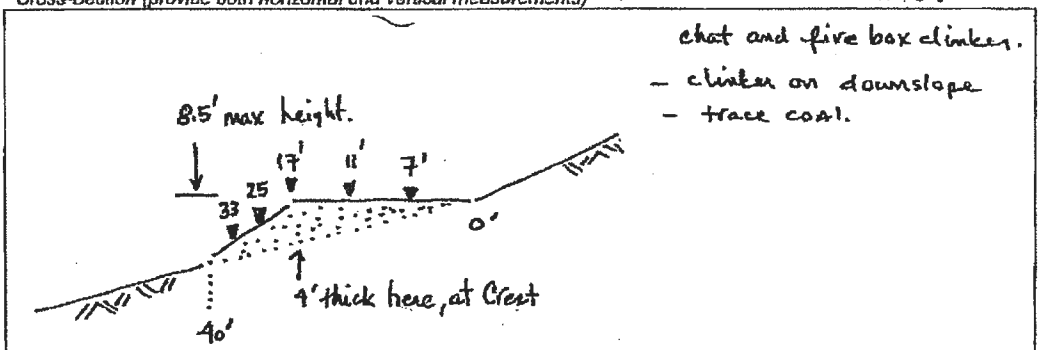
Site Sketch (provide horizontal measurement if drawing is not to scale)



Vegetation Description: Same as HRR-5

hardwoods 2-12" dia growing thru fill side - relatively stable slope

Cross-Section (provide both horizontal and vertical measurements) occ. washouts at other locs.



Sampling Method: Shovel, 5 pt Composite Sample ID(s) 11/15/06

Analysis Requested 6010B for Cd, Pb and Zn Volume: 8 oz Laboratory: EAL

Comments: Standard east/fill

HRR-4, Looking south.

HRR-4, Downslope.

Historical Railroads Ballast Characterization

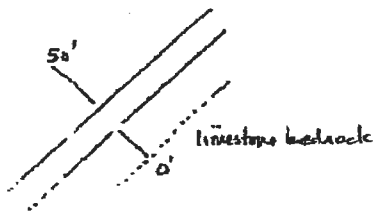
Sampling Location: HRR-5 Date: 11/15/06 DRH/LH/BG-

GPS N. 37° 53' 29.064 and W. 90° 35' 10.248" Between LW&BT

Site Sketch (provide horizontal measurement if drawing is not to scale)

303' NE of point of switch back.

N.



Legend: Xsec loc.

orig topo.

pix 73 NE along (2499) RR

pix 72 transect/ laborers. (2500)

Mark horizontal locations of all sample aliquots

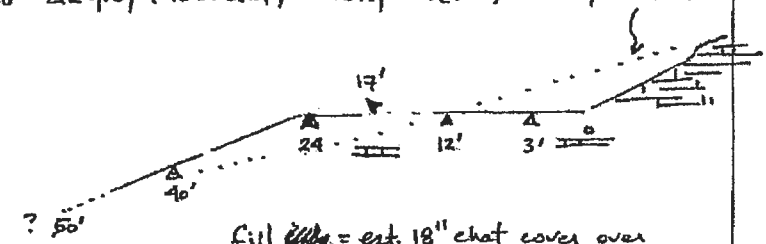
Vegetation Description: scatted hardwoods, med-lite density, cedars

6" layer organics over chat on fill side

Cross-Section (provide both horizontal and vertical measurements)

Aliquots @ 3, 12, 17, 24, 40 dk grey f to c. chat, clinker, coal (trace). orig surface

depth to rock base
@ 12 = 18"
@ 24 = 17"



fill = est. 18" chat cover over base of LS from 0'-50'

Legend: 5 part composite. time 0830 hrs.

XRF Pb = 5220 ppm.

AREA = 1.5' x 50 = 75 ft²

Mark locations of all sample aliquots

Sampling Method: shovel Sample ID(s) HRR-5

Analysis Requested 6010B for Cd, Pb and Zn Volume: 8oz Laboratory: EAL

Comments: cut/fill transect.

HRR-5, Northeast along railroad.

HRR-5, Looking southwest, transect in foreground.

NEWFIELDS

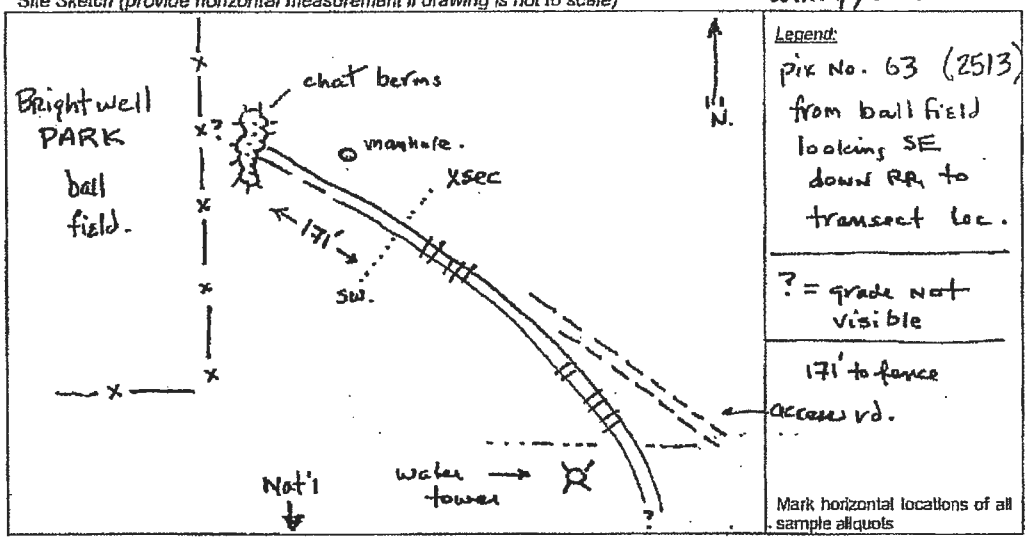
Historical Railroads Ballast Characterization

Sampling Location: HRR-6 Date: 11/16/06 dah/lh/bg

GPS N. 37° 51' 55.940" and W 90° 31' 01.082" National

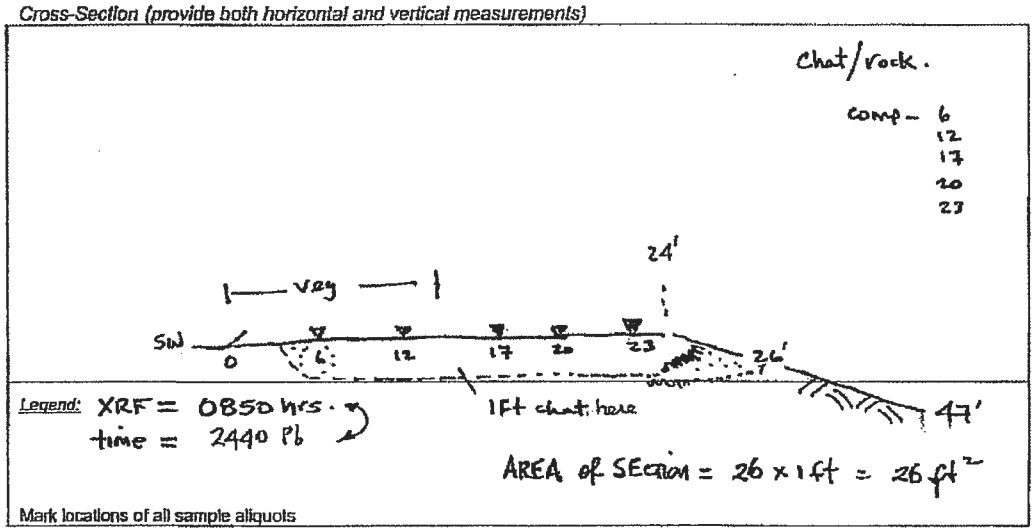
Windy, cold

Site Sketch (provide horizontal measurement if drawing is not to scale)



Vegetation Description: dense hardwoods & cedars, grass slopes, barren on-grade, not used for vehicles, overgrown an obscured at SE end.

Cross-Section (provide both horizontal and vertical measurements)



Sampling Method: shovel, 5 pail. Sample ID(s) HRR-6

Analysis Requested 6010B for Cd, Pb and Zn Volume: 80Z Laboratory: EAL

Comments: end RR at ballfield, no evidence remains to the NW. end RR @ water tower

HRR-6, From ball field looking southeast down railroad to transect location.

Historical Railroads Ballast Characterization

Sampling Location: HRR-7 (St Joe) Date: 11/16/06

GPS _____ and _____ N of Fed

Site Sketch (provide horizontal measurement if drawing is not to scale)

could not find track ballast in/around Shaw Branch below tails dam.	*Legend:* Mark horizontal locations of all sample aliquots

Vegetation Description: _____

Cross-Section (provide both horizontal and vertical measurements)

Legend: Mark locations of all sample aliquots

Sampling Method: _____ Sample ID(s) _____

Analysis Requested 6010B for Cd, Pb and Zn Volume: _____ Laboratory: EAL

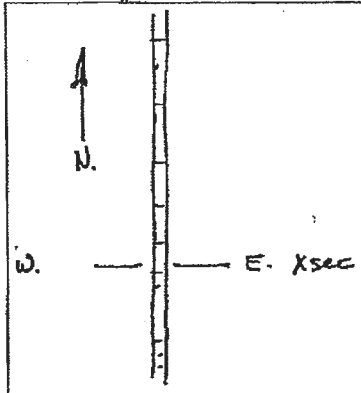
Comments: _____

Historical Railroads Ballast Characterization

Sampling Location: HRR-8 (St Joe) Date: 11/15/08.

GPS N. 37°47'34.168" and 90°30'26.331' SW of Fed

Site Sketch (provide horizontal measurement if drawing is not to scale)

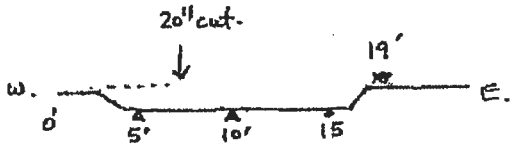


Legend:
Pix No. 68 (2505) looks N.
67 looks S. (2507)

Mark horizontal locations of all sample aliquots

Vegetation Description: hardwood forest, same as Park. No erosion, well veg.

Cross-Section (provide both horizontal and vertical measurements)



Aliquots.
Comp. 5' 2" chat
10' 12"+
15 12"+
19' chat/soil mix
0' all soil

* for ballast vol. calcs, use 12" x 10'

Legend:
4 part composite sample
XRF Pb conc. = 4910
TIME = 1530 hrs.

AREA = 10 ft²

Mark locations of all sample aliquots

Sampling Method: Shovel Sample ID(s) HRR-8

Analysis Requested 6010B for Cd, Pb and Zn Volume: 802 Laboratory: EAL

Comments: cut only, very little chat, only used to seat ties.

HRR-8, Looking north.

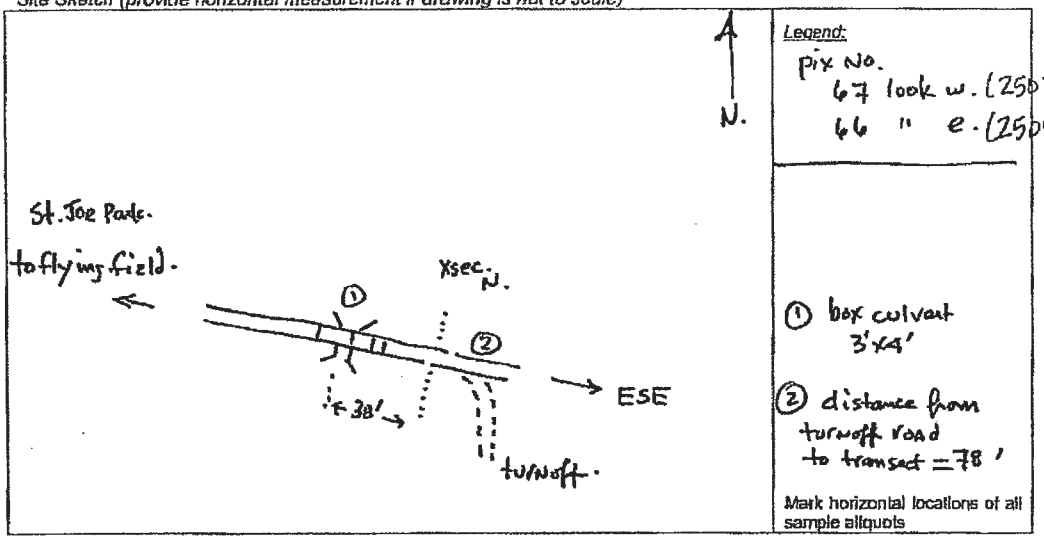
HRR-8, Looking south.

Historical Railroads Ballast Characterization

Sampling Location: HRR-9 (St Joe) Date: 11/15/06

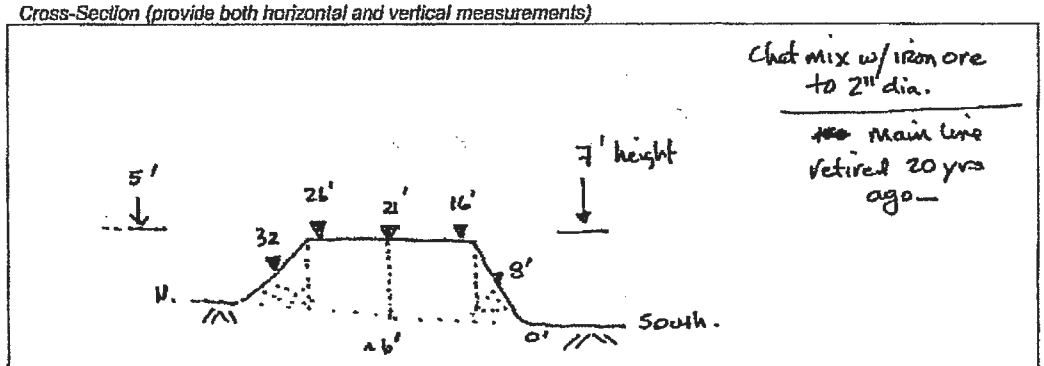
GPS N. 37° 46' 19.434" and W. 90° 29' 10.043" rain. S of Fed toward DR

Site Sketch (provide horizontal measurement if drawing is not to scale)



Vegetation Description: St Joe Park hardwood forest, no erosion, 3" organics roots.

Cross-Section (provide both horizontal and vertical measurements)



Sampling Method: Shovel Sample ID(s) HRR-9

Analysis Requested 6010B for Cd, Pb and Zn Volume: 80Z Laboratory: EAL

Comments: fill section. cut section back to west.

HRR-9, Looking west.

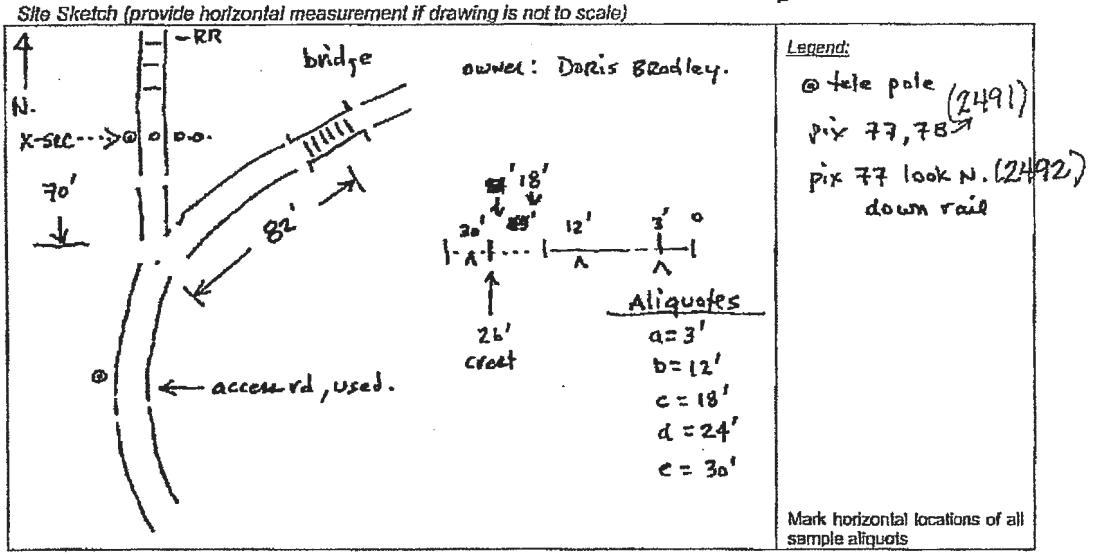
HRR-9, Looking east.

Historical Railroads Ballast Characterization

Sampling Location: HRR-10 Date: 11/14/06

N. GPS 37° 52' 46.347" and 90° 35' 18.880" W. Between LW + BT

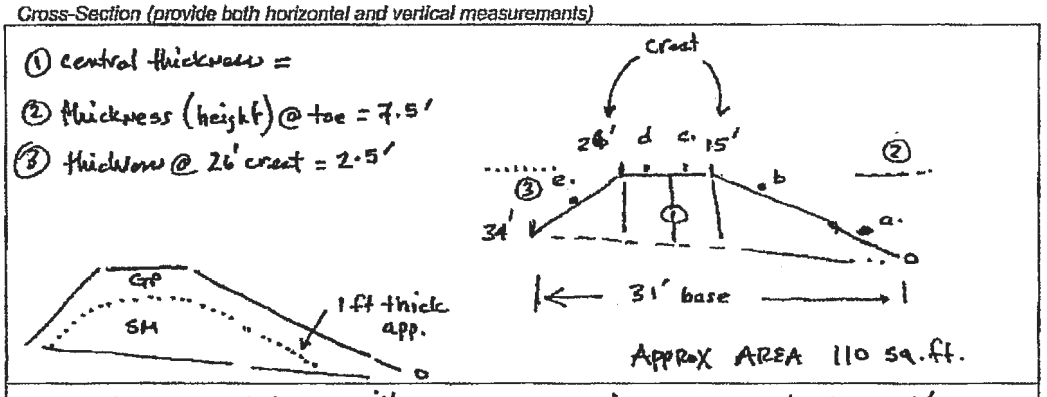
Site Sketch (provide horizontal measurement if drawing is not to scale)



Vegetation Description: RR overgrown w/hardwoods., oaks small. Sycamore max = 16"

DRH, BDG, JLH.

Cross-Section (provide both horizontal and vertical measurements)



Legend: SM core of loam, silt orange brn, moist, no gravel, 60-70% ...
GP chat, some fines, coal, clinker., est thick 1 ft overall
SM core cut from west hillside.

Mark locations of all sample aliquots

Sampling Method: Shovel/trowel Sample ID(s) HRR-10

Analysis Requested 6010B for Cd, Pb and Zn Volume: jar. Laboratory: EAL

Comments: Time = 1400 hrs.

HRR-10, Looking north down rail.

HRR-10, Looking west.

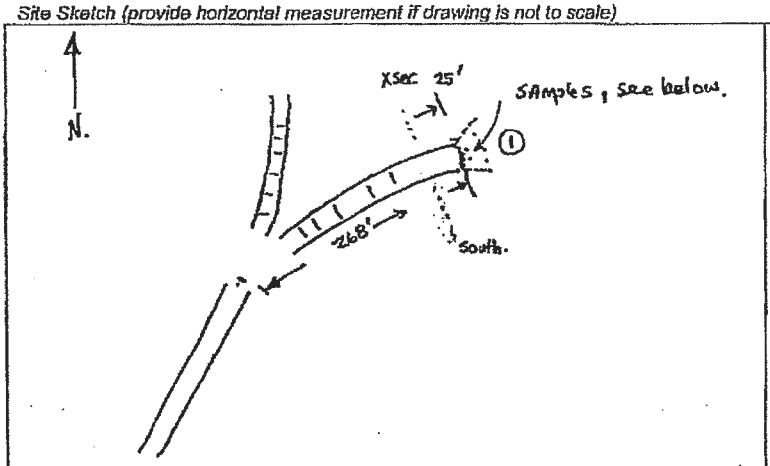
Historical Railroads Ballast Characterization

DRH, LH, BG

Sampling Location: HRR-11 (relocated) Date: 11/14/06

GPS N 37° 51' 17.976" and W 90° 33' 29.428" Between DL & LW

Site Sketch (provide horizontal measurement if drawing is not to scale)



① cut face of RR grade, quarried for chat.

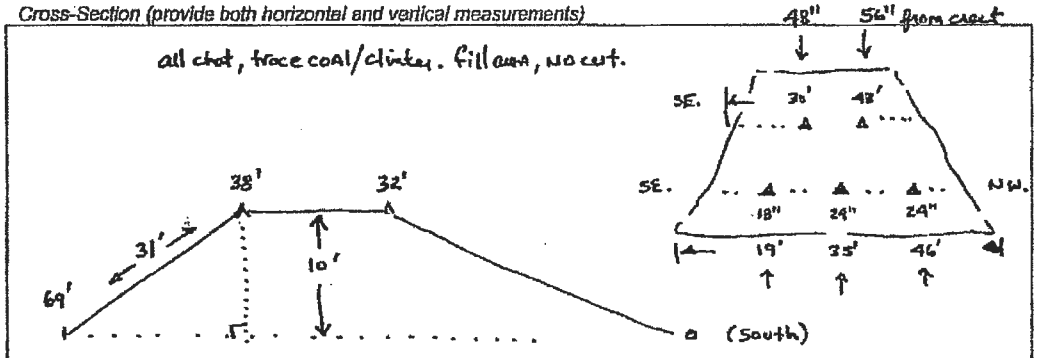
Legend:
Pix #73, eroded end, sample loc. (2498)
Pix #74: transect for volume. (2497)

OWNER: W. Sutton

Mark horizontal locations of all sample aliquots

Vegetation Description: tree'd RR grade, same as HRR-1; 3-5" organic layer except used road surface, grass and moss on very stable side slopes, no rills/erosion of side slopes.

Cross-Section (provide both horizontal and vertical measurements)



Legend: XRF of Composite 3450 Pb.
TIME = 1615

AREA: 60 ft²
: 140 ft²
: 135 ft²
335 ft²

Mark locations of all sample aliquots

Sampling Method: composite, 5 part Sample ID(s) HRR-11

Analysis Requested 6010B for Cd, Pb and Zn Volume: 8oz Laboratory: EAL

Comments: eroded end, cut by creek or mined for chat.

HRR-11, Eroded end, sample location.

HRR-11, Transect for volume.

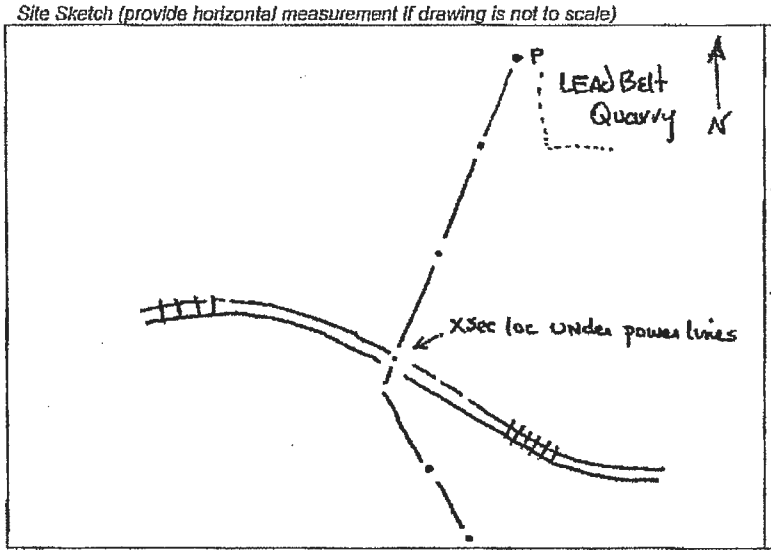
Historical Railroads Ballast Characterization

Sampling Location: HRR-12 Date: 11/16/06

GPS N. 37° 50' 23.695" and W. 90° 32' 46.018"

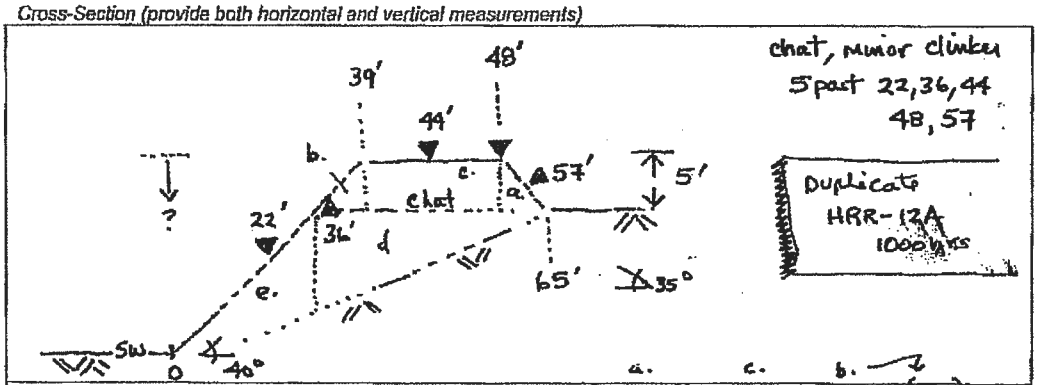
RM DRH/LH/BG

Site Sketch (provide horizontal measurement if drawing is not to scale)



Vegetation Description: short slope barren, steep slope had vines brush, small trees, minimal soil development due to steep 45° slope

Cross-Section (provide both horizontal and vertical measurements)



Sampling Method: Shovel, 5 pat composite Sample ID(s) HRR-12

Analysis Requested 6010B for Cd, Pb and Zn Volume: 8 oz Laboratory: EAL

Comments: Use this volume NW to Y in railroad, some large fill sections to NW as RR crosses the ridge, also cut sections but vol. approx.

HRR-12, Looking downhill east southeast along railroad.

HRR-12, South down long slope on transect

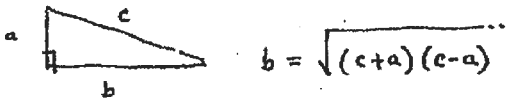
Historical Railroads Ballast Characterization

Sampling Location: HRR-13 (St Joe) Date: 11/16/06

GPS 37° 48' 56.814" and 90. 28' 42.435" W. E of Fed

Site Sketch (provide horizontal measurement if drawing is not to scale)

paved bike trail in St. Joe PARK -



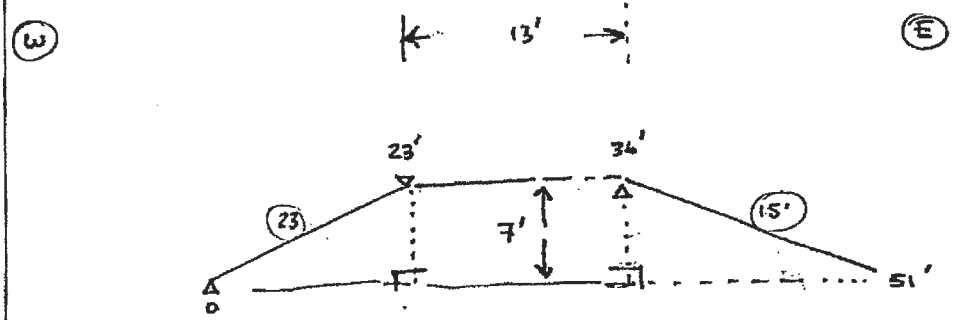
Legend:

by LARRY Hopkins
12/13/06
no pix

Mark horizontal locations of all sample aliquots

Vegetation Description:

Cross-Section (provide both horizontal and vertical measurements)



Legend: Volume =

Xsec Area = (13' x 7') + 76.7 + 46.4 = 214 ÷ 27 = 7.9 cy.

Mark locations of all sample aliquots

Sampling Method: none Sample ID(s) None

Analysis Requested 6010B for Cd, Pb and Zn Volume: Ø Laboratory: EAL

Comments:

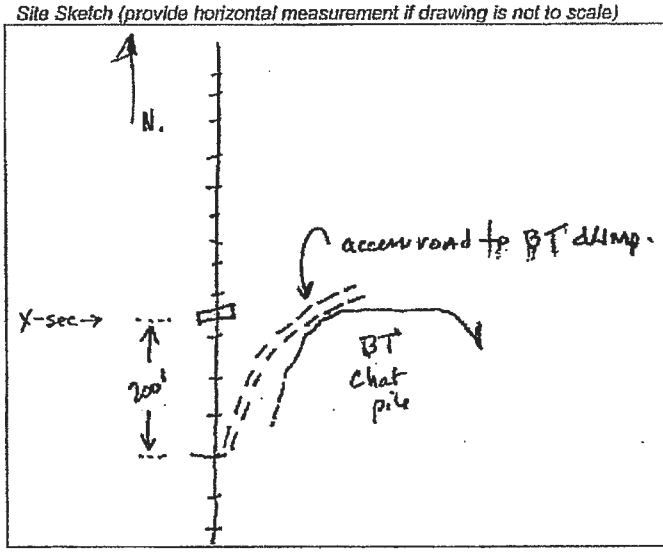
HRR-14

Historical Railroads Ballast Characterization

Sampling Location: Bowie Texas chat pile Date: 11/15/04

GPS N. 37° 55' 46.898" and W. 90° 33' 03.970" 11:16 am.

Site Sketch (provide horizontal measurement if drawing is not to scale)

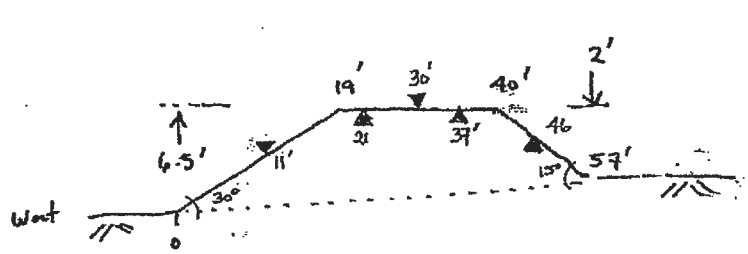


Legend:
#69 pix (2504)
look south to BT pile along RR

Mark horizontal locations of all sample aliquots

Vegetation Description: cedars, thick. long slope w/ vines, bush, well-rooted.
Chat top is traveled road (barren).

Cross-Section (provide both horizontal and vertical measurements)



5 part Composite
46' - soil
37' - clinker, coal, chat
30' - chat
21' - w/clinker
11 - same

Legend: Time 11:16 am.
XRF = 3480

Approx. AREA
14 ft²
84 ft²
52 ft²
150 ft²

Mark locations of all sample aliquots

Sampling Method: shovel - 5 part Sample ID(s) HRR-14

Analysis Requested 6010B for Cd, Pb and Zn Volume: NA. Laboratory: EAL

Comments: Section only

HRR-14, Looking south to Bonne Terre pile along railroad.

SEMO-006936
ASARCOSEMO00026955

0 650 1,300 2,600 3,900 5,200
Ft

Figure A-1
Bonne Terre Area

0 600 1,200 2,400 3,600 4,800 Feet

Figure A-7
Doe Run Area